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September 29, 2011

Mr. Robert Stein
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Docket No. LIFE-CYCLE 2011 - LIFE-CYCLE 2011

Dear Mr. Stein:

This letter provides the response to requests for the information listed below.

Response to CSC-01 Interrogatories dated 09/15/2011
CSC-001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014*, 015

Very truly yours,

John Morissette /dcl

John Morissette
Manager
Transmission siting and Permitting
NUSCO
As Agent for CL&P

cc: Service List

* Bulk material provided.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide updated costs for operation and maintenance of The Connecticut Light & Power Company's (CL&P) existing overhead and underground transmission lines (FERC Accounts 563, 564, 571, and 572).

Response:
Below are the updated costs for operation and maintenance of The Connecticut Light & Power Company's (CL&P) existing overhead and underground transmission lines (FERC Accounts 563, 564, 571, and 572) for years 2006 through 2010.

FERC No.	Description	Year				
		2006	2007	2008	2009	2010
563	Overhead Lines Expenses	$ 658,319	$ 639,019	$ 1,094,006	$ 1,403,719	$ 990,263
571	Maintenance of Overhead Lines	$ 2,691,439	$ 4,015,293	$ 5,219,701	$ 4,983,971	$ 5,287,547
	Total O&M Cost Overhead Lines	$ 3,349,758	$ 4,654,312	$ 6,313,707	$ 6,387,690	$ 6,277,810
	Overhead circuit miles	1,627	1,619	1,636	1,636	1,638
	Cost per circuit mile	$ 2,059	$ 2,875	$ 3,859	$ 3,904	$ 3,833
564	Underground Lines Expenses	$ 186,359	$ 158,514	$ 203,708	$ 282,561	$ 280,338
572	Maintenance of Undergound Lines	$ 179,070	$ 1,039,017	$ 431,659	$ 500,917	$ 1,389,449
	Total O&M Cost Underground Lines	$ 365,429	$ 1,197,531	$ 635,367	$ 783,478	$ 1,669,787
	Underground circuit miles	71.0	71.0	135.0	135.0	135.0
	Cost per circuit mile	$ 5,147	$ 16,867	$ 4,707	$ 5,804	$ 12,369

The table summarizes the overhead and underground transmission operation and maintenance costs that CL&P reported to the Federal Energy Regulatory Commission for the years 2006-2010 (FERC Report Form No. 1, Accounts 563 and 571 for overhead transmission lines and Accounts 564 and 572 for underground transmission lines). From this data, we have also computed the average cost per circuit-mile in each year for CL&P's overhead and underground transmission lines. The data excludes the cost of Operation Supervision and Engineering and Maintenance Supervision and Engineering, FERC Accounts 560 and 568, respectively. An indeterminate share of the cost in these two FERC Accounts is associated with the operation and maintenance of transmission lines.

Note, breakdowns of O&M costs on a line-by-line basis or by line voltage are not available.

Please note that a significant and infrequently occurring maintenance event can distort maintenance costs in any given year, particularly for the underground transmission line asset class with its relatively small number of circuit miles. Significant events did occur in 2007 and 2009, each associated with a cable failure and associated repair.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide updated capital costs ($/mile) for overhead transmission lines that CL&P uses to compare alternative single circuit line structures and designs for 115 kV and 345 kV lines of the following types:

- Wood pole
- Steel pole
- Confirm that you still do not use steel tower structures in any of your designs

If possible, break these costs into the following categories:

- Conductors
- Towers/supporting structures
- Land costs
- Insulation costs
- Other (please specify)

If the costs are not available for all of these categories, please provide them in as much detail as possible for the categories CL&P routinely uses.

Response:

Updated capital costs per mile for 115-kV and 345-kV overhead transmission lines for generic comparisons are:

	Wood 115-kV Single Circuit typically H-frame	Steel 115-kV Single Circuit typically monopole	Wood 345-kV Single Circuit typically H-frame	Steel 345-kV Single Circuit typically monopole
Engineering/ Project Management	$423,000	$517,000	$549,000	$688,000
Material	$344,000	$793,000	$830,000	$1,723,000
Construction	$1,285,000	$1,790,000	$2,077,000	$2,618,000
Overheads	$1,263,000	$1,771,000	$1,965,000	$2,686,000
Totals	$3,315,000	$4,871,000	$5,421,000	$7,715,000

While CL&P's current standard is to use wood, wood laminate, or tubular steel structures, there may be situations in which a steel lattice structure is appropriate.

Notes:
1. Costs are provided using the categories CL&P routinely uses.
2. Costs may vary significantly due to adverse soil conditions such as rock, water, and/or contaminated soil.

3. All costs are in 2011 dollars.
4. Estimates based on Northeast Utilities Transmission's Estimate Database and actual costs for recently completed work.
5. No land costs are included in the above costs due to high variability in property acquisition costs.
6. No substation improvements are included in the above unit costs.
7. Typical conductor size is 1272-kcmil ACSS for 115-kV.
8. Typical conductor size is 2 bundle 1590-kcmil ACSS for 345-kV.
9. Estimates assume 10 structures per mile, include eight tangents, one angle and one dead-end.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide the same information requested in the previous question for double circuit structures and lines or confirm the discontinued use of double circuit designs for 115 kV and 345 kV transmission lines.

Response:
Updated costs per mile for 115-kV overhead transmission lines for generic comparisons are:

	Steel 115-kV Double Circuit typically monopole
Engineering/Project Management	$628,000
Material	$1,076,000
Construction	$2,638,000
Overheads	$2,419,000
Totals	$6,761,000

CL&P does not have recent data for double-circuit 345-kV lines. Because the loss of both circuits on a double-circuit line due to a common cause (e.g., structure failure) is considered a single contingency event in system reliability planning, CL&P expects less use of 115-kV double-circuit transmission lines in the future.

No cost estimates are provided for 345-kV double-circuit transmission lines because the loss of two 345-kV transmission circuits for a single contingency typically has too great an impact on system reliability.

Notes:

1. Costs are provided using the categories CL&P routinely uses.
2. Costs may vary significantly due to adverse soil conditions such as rock, water, and/or contaminated soil.
3. All costs are in 2011 dollars.
4. Estimates based on Northeast Utilities Transmission's Estimate Database and actual costs for recently completed work.
5. No land costs are included in the above costs due to high variability in property acquisition costs.
6. No substation improvements are included in the above unit costs.
7. Typical conductor size is 1272-kcmil ACSS.
8. Estimates assume 10 structures per mile, include eight tangents, one angle and one dead-end.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide updated capital costs ($/mile) for underground transmission lines that CL&P uses to compare alternative 115 kV and 345 kV lines of the following types:

- High pressure fluid filled (HPFF)
- Cross-linked polyethylene (XLPE)

If possible, break these costs into the following categories:

- Cable costs
- Piping and associated supporting structures
- Conduit costs
- Other supporting structures
- Land costs
- Installation costs
- Other (please specify)

If the costs are not available for all of these categories, provide them in as much detail as possible for the categories CL&P routinely uses.

Response:
Updated costs per mile for underground XLPE and HPFF transmission lines for generic comparisons are:

	XLPE 115-kV Single Circuit	XLPE 115-kV Double Circuit	HPFF 115-kV Single Circuit	XLPE 345-kV Single Circuit	XLPE 345-kV Double Circuit	HPFF 345-kV Single Circuit	HPFF 345-kV Double Circuit
Engineering/ Project Management	$2,659,000	$4,090,000	$1,154,000	$2,566,000	$3,948,000	$1,282,000	$1,973,000
Material	$2,919,000	$4,491,000	$2,759,000	$3,963,000	$6,096,000	$3,066,000	$4,717,000
Construction	$7,444,000	$11,445,000	$5,489,000	$8,580,000	$13,616,000	$6,099,000	$9,383,000
Overheads	$5,759,000	$8,857,000	$5,568,000	$6,592,000	$10,142,000	$6,187,000	$9,518,000
Totals	$18,781,000	$28,883,000	$14,970,000	$21,701,000	$33,802,000	$16,634,000	$25,591,000

Notes:

1. Costs are provided in the categories CL&P routinely uses.
2. Costs may vary significantly due to adverse soil conditions such as rock, water, and/or contaminated soil.
3. All costs are in 2011 dollars.
4. Estimates based on Northeast Utilities Transmission's Estimate Database and actual costs for recently completed work.
5. No land costs are included in the above costs due to high variability in property acquisition costs.

6. No substation improvements or overhead to underground transition stations are included in the above unit costs.
7. All underground cable construction costs exclude reactors.
8. Since it is usually necessary at 345 kV to use two (or more) parallel cable sets to provide ampacities similar to that provided by one overhead line, the 345-kV XLPE and HPFF double-circuit costs should be compared to single 345-kV overhead circuit costs.
9. Assumed conductor size for 115-kV XLPE cables is 3000 kcmil.
10. Assumed conductor size for 345-kV XLPE cables is 3000 kcmil.
11. Assumed conductor size for HPFF cables is 2500 kcmil.
12. HPFF underground lines require pressurization plants at each end of the line, the cost of these pressurization plants is approximately $2,000,000 which has not been included in the above cost estimates.
13. The 345-kV cable systems have high charging currents which for typical circuit lengths will require compensation by shunt reactors. These shunt reactors would be located at the terminal substations of an underground 345-kV circuit, or at line transition stations built specifically for transitions between overhead and underground segments of a 345-kV circuit. The initial and ongoing costs of these shunt reactors and associated equipment is not included in the above estimates for 345-kV cable lines.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide an estimate of the total operating and maintenance (O&M) costs per circuit-mile for overhead and underground 115 kV and 345 kV transmission facilities as applicable for the years 2006 through 2010.

Response:
Please see the response for Q-CSC-001.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
In the 2006 CSC Interrogatories, CL&P indicated they use primarily Western Red Cedar structures treated with pentachlorophenol (Penta) for transmission construction.

a) Does CL&P continue to use Penta as a wood pole preservative?
b) Is CL&P exploring other alternative treatments and/or pole materials for future transmission line construction?
c) How would these alternatives affect the life-cycle costs for transmission lines?

Response:

a. Yes.
b. No. Arsenic salts are alternative preservatives for some wood species such as southern yellow pine but not for western red cedar. There is no other widely accepted alternative treatment for western red cedar. CL&P does use tubular steel poles as an alternative material. In addition, the use of modular composite poles (polyurethane resin-fiber reinforced) is being explored. In 2011 CL&P's sister company Western Massachusetts Electric Company installed five composite pole H-frame structures on the Elm-Blanford 1512 line and will be monitoring their performance.
c. Steel poles typically have a longer service life than wood poles due to their resistance to insects and decay. Affects on life cycle cost will vary based on the initial material costs, as dictated by a line's design needs. It is too early to assess the performance and affects of polyurethane resin-fiber reinforced poles on transmission line life-cycle cost.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
In the 2006 CSC Interrogatories, CL&P stated that for transmission line life-cost analysis, the estimated lifespan for transmission lines is 40 years. Does CL&P still agree with this estimate?

Response:
Yes. The estimated life span used for transmission life-cost analysis is 40 years. Transmission lines have reliably and safely performed for longer periods if well maintained and with life -extending component replacements (e.g., wood cross-arms,shield wires,conductor splices).

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
In the 2006 CSC Interrogatories, CL&P indicated they agreed with the following life expectancies for 115 kV transmission facilities from the 1996 Acres Report:

- Wood Pole 40 years
- Steel Pole 60 years
- Underground Cable 35 to 40 years

a) Does CL&P still agree with these life expectancies?
b) If not, what typical life expectancies would CL&P use for each of these transmission types?
c) Previously, CL&P indicated they would expect the same life expectancy for a 345 kV transmission line as for 115 kV lines using similar materials. Would you still agree with this?
d) CL&P indicated an expected operational life of 35 to 40 years for both 115 kV and 345 kV HPFF and XLPE underground cable in the 2006 CSC Interrogatories. Provide any updated life expectancies for 115 kV and 345 kV HPFF and XLPE underground cable based on experiences since the previous interrogatories.

Response:

a) Yes
b) N/A
c) Yes
d) Based on experience to date, the typical life expectancies for both 115-kV and 345-kV underground HPFF cable systems are 35 to 40 years. In 2008 CL&P completed installation of 18 circuit miles of 115-kV and 48 circuit miles of 345-kV XLPE cable . It is too early to predict life expectancy based on CL&P's operating experience to date. However, based on industry performance of other solid dielectric cable systems in the 115-kV to 170-kV class that have been in service for over 20 years, it is reasonable to anticipate a life expectancy of 35 to 40 years for the XLPE system.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide any updates to CL&P's use of polymer, porcelain and glass insulators for 115 kV and 345 kV transmission lines.

Response:
CL&P primarily uses porcelain insulators for its new 115-kV and 345-kV transmission lines due to their proven performance throughout the industry. CL&P has also installed non-ceramic insulators in the past on several 115-kV lines in Connecticut. CL&P has experienced brittle fracture of some non-ceramic insulators due to water intrusion. Industry performance has found corona cutting of non-ceramic insulators while in service, so some manufacturers now require corona rings on 115-kV non-ceramic insulators. In addition, there is no accepted practice for testing non-ceramic insulators for defects in support of live line work. As a result, CL&P has eliminated the use of non-ceramic insulators going forward.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Has CL&P performed any more research, evaluation, or possibly even installation, of composite conductors on any of your transmission facilities? If so, what is the estimated life cycle cost impact? Break into first cost and O&M cost elements.

Response:
CL&P continues to monitor the development of composite core conductor technologies. As an example CL&P participated in a study of High Temperature Low Sag ("HTLS") conductors with the New York State Energy Research and Development Authority (NYSERDA) and NGRID. CL&P has adopted Aluminum Core Steel Supported ("ACSS") HTLS conductor as its standard for new transmission line designs. CL&P has not installed any composite core conductors on its transmission system. Order-of-magnitude cost assessments indicate that composite core conductor costs approximately 2.5 times more than an equivalent diameter ACSS conductor.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Has CL&P experienced, in the last five years, issues with construction or maintenance of transmission lines in locations that required special processes or procedures due to environmental sensitivity? If so, please describe the situations and the cost impacts.

Response:

CL&P routinely encounters environmental issues associated with construction and maintenance of transmission lines in locations that require special processes or procedures due to environmental sensitivity.

CL&P reviews construction and maintenance projects for environmentally sensitive areas and utilizes its Construction and Maintenance Best Management Practices ("C&M BMPs") when working in wetland areas and for stormwater management--erosion and sediment control. For example, swamp mats are used when vehicles require access to minimize damage to wetland areas in accordance with local, state and federal regulations. Stormwater management controls are required in accordance with state and federal regulations during maintenance and construction activities.

In addition to following the C&M BMPs, CL&P also protects endangered species by hiring biologists, educating all construction crews and installing protective fencing to ensure that rare, threatened, or endangered species are not adversely affected by construction projects. Where feasible, the company will also work during different times of the year to help prevent adverse affects to the environment. Lastly, the company uses different types of construction methods such as horizontal directional drilling and helicopters to avoid/mitigate environmental effects.

A summary of the general issues and associated cost impacts follow:

Wetland Area Protection

- Swamp mats: $50-75/linear foot installed
- Work pads: approximately, $15,000 per work pad (60 ft x 60 ft) installed and removed (assuming two months of rental).

Stormwater Management

- Silt fences and hay bales: $9/linear foot installed.
- Culverts: $4,500/pipe installed (steel corrugated - 18 in X 20 ft).
- Site restoration (grading, mulch, seeding, etc.): $5,000/mile.

State regulations and requirements require special handling and disposal of contaminated and/or polluted soil and water encountered during excavation activities for overhead and underground facilities.

Soil disposal (polluted/contaminated)

- $1,300 per ton which includes shipping the contaminated soil a substantial distance out of state. Specific example: Waterside Substation

Water disposal (polluted/contaminated) from dewatering activities

- Approximately $130,000 for dewatering and cleaning of the dewatering tank. Specific example: Waterside Substation

Soil & water lab testing

- Approximately $19,000 for testing, soil characterization and reports. Specific example: Waterside Substation

Endangered Species Protection Act (state & federal)

- Negligible cost effects

Invasive Species Control Plans

- Invasive Specifies Control Plans for the Middletown-Norwalk project, the initial Invasive Species evaluation and report was $30,000 for 2010 and $13,000 for ongoing monitoring for the ovehead portion of the project during 2011, 2012, and 2013.

CL&P has experienced delays in permitting as a result of delays in U.S. Army Corps of Engineers applications needed to satisfy the consultation requirements of Section 106 of the National Historic Preservation Act.

The reduction of magnetic field exposures is sometimes considered to be an "environmental" issue. The Council's EMF Best Management Practices provide a guideline or benchmark of 4 percent of project costs (including substation costs) for lower magnetic field line designs. While CL&P has not yet incurred extra construction costs for underground construction to meet the requirements of P.A. 04-246 for minimizing magnetic field exposure in certain areas, were it to be required to do so, the costs would be very high. Costs of magnetic field reduction have been determined to be ineligible for regional cost recovery by ISO-NE.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Would CL&P say the ISO-NE planning and operating standards for design and operations of transmission facilities have had an impact on CL&P transmission line life cycle costs and if so, to what extent?

Response:
The ISO-NE planning and operating standards for design and operations of transmission facilities have not had a significant impact on the life cycle costs of CL&P's transmission lines. For example, ISO-NE planning and operating standards do not mandate a specific transmission structure type, size, or design.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Has CL&P identified any other ISO-NE policies or operating procedures that impact transmission line life cycle costs since responding to the previous interrogatories? If so, what are they and what is the anticipated impact?

Response:
CL&P is not aware of any ISO-NE policies or operating procedures that impact transmission line life-cycle costs. However, CL&P's experience with the ISO-NE Transmission Cost Allocation process has shown that costs over and above those to site and build a feasible and practical transmission line in Connecticut are allocated 100 percent to Connecticut customers. For example, if the cost of a new transmission line is higher because part of it was constructed underground at higher cost when a lower cost overhead line was feasible and practical to build, the extra costs would be disallowed for regional cost recovery.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide any updates to CL&P's consideration of using high voltage direct current (HVDC) lines and the impacts to life-cycle costs as compared to alternating current (AC) transmission lines?

Response:
The discussion of "HVDC Typical Costs" in the Council's *Life Cycle 2007* in section 5.3.2 remains appropriate; however, Table 5-4 should be reviewed to determine if updates to the "Installed Cost" column are necessary. Additionally, CL&P is attaching an excerpt and associated appendix from the "Solution Report for the Interstate Reliability Project" dated August, 2008 concerning a potential HVDC line. While the report ultimately does not recommend the HVDC option, the discussion in the report of the HVDC evaluation helps to supplement the information contained in the Council's *Life Cycle 2007* report.

* Bulk material provided.

Witness: CL&P Panel
Request from: Connecticut Siting Council

Question:
Provide any comments and/or suggestions regarding how the Council's Life Cycle 2007 report could be improved.

Response:

Before responding directly to this request, please find attached CL&P's transmittal to the Council dated March 16, 2006 in regard to the Council's previous life-cycle cost investigation and specifically responding to a Council invitation to comment on the prospective value of periodic life-cycle cost investigations of transmission lines and of the annual forecast of loads and resources. CL&P's comments therein in regard to the life-cycle cost investigations remain the same in 2011, and CL&P views the Council's "Life Cycle 2007" report as an excellent product of the last investigation.

The Life Cycle 2012 report should continue to cover the same topics as in the 2007 report and should seek to document new pertinent information from the last five years. For example, there is more operating and construction cost experience since 2007 with underground XLPE cable systems, the Council has completed another major transmission line case (Docket 370), CL&P is now standardized on use of aluminum conductor steel supported ("ACSS") rather than aluminum conductor steel reinforced ("ACSR") for new overhead transmission lines, and steel for 345-kV line H-frame structures is becoming more common. There are also regional cost allocation decisions for Connecticut transmission projects which would be useful to discuss in regard to costs now borne solely by Connecticut consumers.

The next report would be improved by making efforts to avoid potential confusion in regard to double-circuit transmission lines. Overhead versions of such lines are no longer popular with system planners because of regional planning criteria, and underground double-circuit (or even triple-circuit) lines exist primarily to do the job of a single-circuit overhead line. Therefore, less or clearer use of the phrase "double-circuit" in the next report would be an improvement.

Another opportunity for improvement is to be very careful when using cost estimates derived from installations made by different utilities in different conditions. For example, significant text in the 2007 report was devoted to explaining why in Tables 3-6 and 3-7 the cost of a single-circuit 115-kV HPFF underground line was close to that for an underground 345-kV line consisting of two HPFF cables. This could have been avoided by using estimates derived from installations by the same utility under comparable conditions. While the life-cycle cost investigation is necessarily generic, actual utility experiences reflect specific circumstances that can make side-by-side comparisons harder and in some cases, problematic.

Finally, the 2007 report had a length which makes an Executive Summary worthy of consideration, especially for the benefit of elected officials who may not have the time to read the entire report.

Northeast Utilities System

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Robert E. Carberry
Manager – Transmission Siting and Permitting

March 16, 2006

Ms. Pamela B. Katz, Chairman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Investigation into the Life-Cycle Costs of Electric Transmission Lines, and Annual Review Forecasts of Electric Loads and Resources

Dear Chairman Katz:

During the January 12, 2006 public hearing concerning overhead and underground electric transmission line technology and comparative life-cycle costs, the Connecticut Siting Council ("Council") invited participants to comment on the prospective value of periodic life-cycle cost investigations of transmission lines ("LC") and of the annual forecast of loads and resources conducted pursuant to Conn. Gen. Stat. §16-50r ("FLR"). The Connecticut Light and Power Company ("CL&P") appreciates the opportunity to submit the enclosed comments in response to the Council's invitation.

Technology and cost are critical to future decisions regarding transmission facilities. CL&P believes that both the LC investigation and the FLR proceeding provide for the exchange of valuable and ever-changing information regarding load growth, available resources, new and developing technologies, as well as current cost information applicable to transmission line facilities in Connecticut. The availability of current information is particularly important in the current era of dynamic industry change.

The LC investigation enables the Council and staff to receive current information concerning relevant technological developments and costs associated with both established and developing technologies, thereby assisting the Council in its evaluation of individual projects, as they are proposed. The FLR proceeding informs the Council about the likely future needs for generation and transmission facilities and thus provides essential information to the Council in carrying out its statutory duties. In addition, the FLR proceeding provides an opportunity for Connecticut to strengthen its planning link with ISO-NE and thereby optimize the efficacy of solutions to Connecticut's energy challenges. The reports issued at the conclusion of each of these proceedings are not only valuable references for the Council, but are also useful in educating the public, legislators, and other public officials.

The Connecticut Siting Council is the State agency charged with the responsibility for determining the need for certain facilities to be used in providing public utility services and balancing that need against anticipated environmental impacts and costs. Council members and staff must fully understand the public need issues and priorities in order to carry out this important responsibility. Accordingly, the Council remains the appropriate state agency to conduct both the LC investigation and the FLR proceeding.

Thank you for the opportunity to provide the enclosed comments. CL&P remains available to provide any additional information which would be useful to the Council in its consideration of the future role of these important proceedings.

Sincerely,

Robert E. Carberry

Attachment

cc. Service List for 2006 Life-Cycle Proceeding

Investigation into the Life-Cycle Costs of Electric Transmission Lines and Annual Review Forecasts of Electric Loads and Resources

During the January 12, 2006 public hearing concerning overhead and underground electric transmission line technology and comparative life-cycle costs, the Connecticut Siting Council ("Council") invited participants to comment on the prospective value of periodic life-cycle cost investigations of transmission lines and of the annual forecast of loads and resources conducted pursuant to Conn. Gen. Stat. §16-50r ("FLR"). The Connecticut Light and Power Company ("CL&P") appreciates the opportunity to offer the following comments in response to the Council's invitation.

In recently expanding the role of the Connecticut Energy Advisory Board ("CEAB") by P.A. 03-140 ("An Act Concerning Long Term Planning for Energy Facilities,") the General Assembly recognized the continuing vitality of the FLR and Life-Cycle Cost proceedings. Rather than shifting these Siting Council responsibilities to the CEAB, the General Assembly directed the CEAB to participate in each of these proceedings before the Siting Council. P.A. 03-140, § 16(b)(6) and (7); Conn. Gen. Stats. § 16a-3(b)(6)(7).

In addition, while P.A. 03-140 also directs the CEAB "to prepare a comprehensive energy plan based on existing reports and studies as to the need for new energy resources, new energy transmission facilities in the state and new energy conservation initiatives in the state" ((P.A. 03-140 §16(b)(1), § 17; Conn. Gen. Stats. §16a-3(b)(1), § 17). this legislation does not contemplate that such reports will displace those issued by the Siting Council as part of the FLR and Life-Cycle Cost proceedings. Indeed, a review of the CEAB's 2005 and 2006 Energy Plans emphasizes that the CEAB reports are more general and aspirational, and much less detailed and concrete, than the Siting Council reports; and that, in particular, they do not provide a basis for understanding developing electric transmission issues. The CEAB reports lay down broad energy goals, which look at the long term, and can change substantially from year to year. For instance, the January 2005 CEAB Report included a description of the CEAB's efforts to advance its ten "strategies" adopted in 2004, which included both "1.6 Promote Electric System Reliability and Enhance the Electric Infrastructure;" and "1.7 Enhance Natural Gas Infrastructure." (CEAB, Energy Plan for 2005, January, 2005, Table of Contents; pp. 20-24") However, these goals were not included in the 2005 Report, as the CEAB instead announced a principal goal to "maximize the state's efforts on its number 1 strategy of reducing dependence on fossil fuels." Id., p. 32.

The CEAB has continued this emphasis on the reduction of consumption in its recently adopted 2006 Plan, in which it espouses a goal to "reduce electric peak and fossil fuel consumption by ten percent by 2010." (CEAB, Energy Plan for 2006, February 2006, Table of Contents, pp. 12-33). While this report recognizes "the vital importance of a robust transmission grid," and recommends the timely completion of the transmission upgrades now underway,[1]" (Id., p. 16) it does not purport to forecast whether, or the extent to which, additional transmission upgrades may be required in the future, or the technological choices that would have to be considered in any such proposal. Similarly, in its discussion of "Connecticut's Energy Profile," the CEAB 2006 Report incorporates the Council's assessment of generation facilities in the Council's draft 2005 FLR Report ((2006 CEAB Report, pp. 41-44; CSC Review of Ten Year Forecast of Connecticut Electric Loads and Resources 2005-2014 ("CSC 2005 FLR"), pp. 7-13)),

[1] Bethel – Norwalk 345-kV line; Middletown – Norwalk 345-kV line; and the Glenbrook 115-kV cable project *Id.*, p. 17

but does not refer to the Council's discussion of potential future transmission facilities. (CSC 2005 FLR, pp. 19-21.

Accordingly, the recent expansion of the CEAB's responsibilities in no way diminishes the utility of either the FLR or the Life-Cycle Cost proceedings before the Siting Council, particularly as they relate to electric transmission planning and technology. These proceedings provide for the exchange of valuable information regarding load growth, available resources, new and developing technologies, as well as current cost information applicable to transmission line facilities As the agency charged with the responsibility of determining the need for certain facilities to be used in providing public utility services and balancing that need against anticipated environmental impacts and costs, the Connecticut Siting Council remains the appropriate state agency to conduct these proceedings.

LIFE-CYCLE COST PROCEEDING

Since 1994, Conn. Gen. Stat. §16-50r(b) and (c) has required the Council, "not less than once every five years...to investigate and determine the life-cycle costs for both overhead and underground transmission line alternatives." The Council is authorized to retain expert consultants and must hold a public hearing. Typically, the Council produces a report of its investigation at the conclusion of this proceeding.

The scope of these proceedings, and the reports in which they culminate is, however, much broader than a cost comparison. Section 16-50r (b) of the General Statutes stipulates that the scope of the investigation shall include, in addition to "relevant life-cycle costs:

- relative reliability
- constraints concerning access and construction
- potential damage to the environment and
- compatibility with the existing electric supply system

Moreover, the actual scope of the work of the Council and its expert consultants exceeds the defined minimum scope. The life-cycle reports have included information concerning comparative magnetic field source characterization for overhead and electric lines, and useful information on engineering fundamentals of the transmission system, as well as current and anticipated technological developments. Indeed, the term: "Report Concerning Overhead and Underground Electric Transmission Line Technology and Comparative Life-Cycle Costs" would provide a better indication of the content of these reports than a title that simply refers to comparative costs. Perhaps the readership, and thus the utility, of the reports could be expanded by such a re-naming (particularly if the bulk of the report could be reduced to something comparable to the FLR Report.)

Long before the life-cycle proceeding became a statutory requirement, the Council recognized the benefits of retaining expert consultants to educate it on current electric transmission technology. Shortly after the Council (then-called the Power Facilities Evaluation Council) was formed in 1971, it contracted with Power Technologies, Inc. for a technology/cost report and training. This important goal is now facilitated by Conn. Gen. Stat. §16-50r(b) and (c), requiring the Council to conduct its life-cycle cost investigations every five years.

The life-cycle proceedings enable the Council and staff to keep abreast of relevant technological developments before individual projects are proposed, and thereby assist them in

their investigation of these proposals. Even though, the generic cost numbers of the life-cycle comparison may have little application to the specifics of a given proposal, because of project-specific conditions such as land costs, that generic cost information, as well as the technical information in the report, provides the Council and staff with a very valuable starting point for its investigation of any specific transmission line proposal.

This utility of the life-cycle reports is also important during periods in which relatively few major transmission line applications come before the Council. During the last five years, the Council has been accumulating a very substantial body of knowledge on transmission issues in the course of considering a series of major transmission projects, in some cases with the assistance of expert consultants. But this has not always been so. In the twenty-year period prior to the substantial activity of the last 5 years, only one new 345-kV transmission line was proposed for Council review (1982). During this same period, there were only two new and four reconstructed 115-kV transmission line proposals made to the Council, apart from six proposals in the late 1980s for short 69-kV and 115-kV lead lines to interconnect new independent generators. The last of these transmission line and generator-lead line proposals that was considered by the Council was in 1991. Between 1992 and 2001, no new or reconstructed transmission lines were proposed for council review. During those nine years, the membership and staff makeup of the Council changed frequently. Several of the current Council members and most of the staff were not members of or employed by the Council during one or both of the two previous life-cycle cost investigations that were undertaken by the Council. Given the ever-increasing advance of technology and changes in applicable law (such as P.A. 04-286 creating a presumption in favor of underground transmission facilities under certain circumstances) the periodic opportunity for the Council to enhance their knowledge of advancements in technology and associated costs is invaluable.

Technology and cost are critical to future decisions regarding transmission facilities. The cost of the periodic life-cycle cost investigation of transmission lines is relatively small, and the benefit of having a highly informed Council evaluating future transmission line applications is clearly worth this cost. Also, the Council's ability to administratively notice this report in future transmission line dockets enables a record-building efficiency for sound siting decisions.

Finally, the legislative origin of the life-cycle cost study requirement illuminates a reason for retaining it. As the longest serving members of the Council will remember, the requirement was enacted at the instance of disappointed opponents of certain overhead 115-kV transmission line reconstruction. These generally well-informed and influential stakeholders maintained that, on a life-cycle basis, underground transmission costs would compare to overhead costs very much more favorably than the first costs presented by the utilities suggested, because (since underground lines were out of harm's way during storms and other events) the operation and maintenance costs of underground lines would be far lower, and their reliability would be far greater, as compared with overhead lines. These proponents of a required life-cycle cost investigation expected that an impartial study by an independent consultant would confirm their supposition. Of course, the result of the initial (1996) study showed that the supposition was misguided; that to the extent one-to-one comparisons could be made, the gap between overhead and underground 115-kV transmission line costs was nearly as large on a life-cycle basis as it was on a first-cost basis; and further, that overhead and underground transmission depended on entirely different technologies, so that comparing their utility or feasibility in any given situation presented complex issues.

These fundamental facts are by now well known to the Council and its staff. However, other interested stakeholders, particularly legislators and members of the public who are averse to

overhead construction, are frequently unaware of, or can not accept, them. Thus, a current technological and cost review, sponsored by the Council, and prepared by an independent consultant, will always be potentially useful in educating the public, legislators, and other public officials – provided, of course, that they will read it. This last consideration suggests that efforts should be made to make the Council's life-cylce report more inviting to the lay reader, and we suggest a change to its title to "CSC's Report Concerning Overhead and Underground Electric Transmission Line Technology and Comparative Life-Cycle Costs".

We further respectfully submit that the Council is the appropriate agency to do this work. As the history discussed above shows, this process is consistent with the Council's own efforts to prepare its members and staff to grapple with important technical and economic issues. By maintaining sponsorship of the process, the Council can direct its consultants' efforts so as to assure that all topics that are likely to be of importance in the near future are covered in the investigation and report.

FORECAST OF LOADS AND RESOURCES

Conn. Gen. Stat. §16-50r(a) requires transmission, distribution and generation service companies that operate facilities within the State of Connecticut to file on or before March first of every year a forecast of loads and resources report covering a ten year period. The statute provides that the Council shall hold a public hearing on these reports and, may, at its option, issue its own report, which shall be made available to the public. The Council's report must also be provided to the Energy and Technology Committee of the Connecticut General Assembly, to any member of the General Assembly upon request and to other state and municipal bodies designated by the Council.

The FLR proceeding informs the Council about the likely future needs for generation and transmission facilities. When the Council is called upon to consider applications for approval of electric system elements, this information is useful in making the statutorily required determination whether a proposed "facility conforms to a long-range plan for expansion of the electric power grid of the electric systems serving the state and interconnected utility systems. (Conn. Gen. Stat. §16-50p(a)(2)(D)(ii)). This provision recognizes that required additions to the system should be identified, at least in concept, long in advance, so that plans can be made to ensure a reliable and adequate electric energy supply and energy delivery future for Connecticut. Because it can take years to permit and build generation and transmission facilities, a long-term planning horizon is important.

Moreover, the reports that the Council generates as the end product of the FLR proceedings provide a very useful summary of Connecticut's electric infrastructure and the fundamentals of electric generation and transmission, and electricity markets. There is no other comparably concise and user-friendly compendium of this information which is – or should be – of keen interest to all those interested in the adequacy and security of Connecticut's energy supply, including other state agencies, legislators and the public.

The easy availability of fundamental information about Connecticut's current and future electric system requirements, and how those requirements may be met, is particularly important in the current era of dynamic industry change. Significant changes in the structure of the electric industry, and related changes in the performance requirements of the electric transmission system have occurred over the past decade, at the same time as Connecticut's economy and peak electric demands have continued to grow. Urgent needs have developed and increased in recent years for emergency generation and demand response in the Southwest region of Connecticut while major

transmission projects were being delayed. Overall responsibility for bulk power-supply planning has shifted to a regional transmission organization, ISO-New England ("ISO-NE"), and ISO-NE publishes a Regional System Plan each year. Power-supply costs have recently risen significantly and may rise more in the future due to the State's high dependence on natural gas and oil fuels for generation. All of these developments have been, or will be, communicated to interested stakeholders, and put in an appropriate context, by the Council's FLR reports.

Since the advent of electric utility industry restructuring in the late 1990's and the shift to market-driven generation, forecasts of supply resources and of transmission facility needs to integrate new supply resources have become more challenging, and risks of future supply deficiencies in Connecticut have grown. The challenges that confront attempts to forecast future needs include:

- Some approved new generating stations may not be built.
- Older and less efficient generating plants could retire at any time, and have been kept in service because of system reliability needs.
- Connecticut faces supply threats associated with nuclear plant outages and an inadequate natural gas supply.
- Connecticut among the New England states has the least ability to import a significant percentage of its peak power demands.

However, rather than indicating that attempts to forecast future loads and resources should be abandoned, recognition of these challenges counsels that forecasting efforts should be intensified, while stakeholders in the process must be made aware of the difficulties and risks inherent in the process. The Council's FLR reports provide the appropriate means of conveying this information.

In the face of the dynamic industry changes and future energy challenges, Connecticut needs more than ever now to be a proactive partner with ISO-NE in planning for its energy future. The Forecast of Loads and Resources proceeding provides an opportunity for Connecticut to strengthen its planning link with ISO-NE. ISO-NE actively participated in the Council's 2005 FLR proceeding, and the outcome was the Council's best-ever report. It should be required reading for all state legislators and a major input to the State's annual Energy Plan. The Council clearly understands the role and importance of transmission infrastructure in the mix of solutions to Connecticut's energy challenges.

The Connecticut Siting Council is the State agency which is charged with the responsibility of balancing the need for generation, transmission and distribution facilities with anticipated environmental impacts and costs. As such, it should continue to have the responsibility to conduct the Life-Cycle Cost Investigation and the Forecast of Loads and Resources proceedings. The Council members and staff must understand the public need issues and priorities in order to carry out this important responsibility. Other State agencies, such as the Connecticut Energy Advisory Board, should continue to contribute advice and to promote the development of other cost-effective ways of supplying and/or restraining the growth of Connecticut's electric energy demands. However, fracturing or eliminating the current forecasting and energy-supply planning process is not in the State's best interests.

Thank you for the opportunity to provide these comments. CL&P remains available to provide any additional information which would be useful to the Council in its consideration of the future role of these important proceedings.